An02PCT W.Anwander

Claims

1. Electric machine with a rotor (3, 53) and a stator (7, 57), in which electric coils (6, 56) and permanent magnets (5) are located which influence each other when the rotor revolves, where the rotor (3, 53) contains the magnets (5) and the stator contains the coils (6, 56) and the coils (6, 56) do not have an iron core and at least one section of the coils extends transversely across the circumference of the rotor, **wherein** the coils (6, 56) are fitted in the stator (7, 57) individually and are bent in such a way that they extend on both sides of the rotor (3, 53) and enclose the magnets (5) located in the rotor to a large extent.

2. Electric machine according to claim 1, **wherein** the magnets (5) are cylindrical and are located at least approximately tangentially on the circumference of the rotor (3, 53).

3. Electric machine according to claim 1 or 2, **wherein** the permanent magnets (5) are attached to the rotor (3) via support elements (4).

4. Electric machine according to one of the previous claims, **wherein** the coils (6) have a Ω-shaped cross-section and the magnets (5) are immediately next to the inside of the coils.

5. Electric machine according to one of the previous claims, **wherein** the support elements (4) for the magnets (5) are attached to the rotor (3) in such a way that they can be replaced.

6. Electric machine according to one of the previous claims, **wherein** an interlocking facility (73) is provided between the magnets (5) and/or their support elements (4) and the rotor (3), preferably in the radial direction.

7. Electric machine according to one of the previous claims, **wherein** the magnets (5) and/or their support elements (4) are attached to the rotor (3) so that they can be removed in the axial direction.

8. Electric machine according to one of the previous claims, **wherein** the connections (8) for the coils (5, 56) are located so that they are accessible individually on the stator (7, 57).

9. Electric machine according to one of the previous claims, **wherein** the magnets (5) located behind each other have different polarity in each case.

10. Electric machine according to one of the previous claims, **wherein** a pole reversal device is provided in the supply line to the coils (6, 56).

11. Electric machine according to one of the previous claims, **wherein** the coil (6, 56) is annular and the profiles of the rotor (3, 5, 53) and the coil are adapted to each other.

12. Electric machine according to one of the previous claims, **wherein** several rotors (3, 53) and coil configurations are located behind each other in the axial direction of the machine.

13. Electric machine according to one of the previous claims, **wherein** at least two machines preferably in the form of motors with different diameters are located behind each other on a mutual machine shaft (2, 52).

14. Electric machine according to one of the previous claims, **wherein** the coils (6) are formed from several coils that are only one wire layer thick in each case.

15. Electric machine according to claim 14, **wherein** the connections for the individual coils are wired individually and are in particular designed so that they can be connected in series and/or parallel.

16. Electric machine according to claim 14 or 15, **wherein** the individual coil layers are in particular glued together with an adhesive that conducts heat effectively.

17. Electric machine according to one of the previous claims, **wherein** shielding (9) is provided on the outside of the stator (7) that provides magnetic shielding in particular.

18. Electric machine according to claim 17, **wherein** the shielding is made from wire (9), particularly a plurality of soft iron wires.

19. Electric machine according to claim 18, **wherein** the shielding wires (9) are located in concentric circles around the shaft of the machine.

20. Electric machine according to claim 17, 18 or 19, **wherein** the shielding is made from sheet metal, particularly soft iron sheet metal.

21. Electric machine according to one of the previous claims, **wherein** a cable support (10) is provided on the circumference of the rotor – stator assembly.

22. Electric machine according to one of the previous claims, **wherein** a housing (12) is provided that encloses the entire rotor – stator assembly.

23. Electric machine according to claim 22, **wherein** the housing (12) has at least one air inlet opening (11) in the immediate vicinity of the machine shaft (2).

24. Electric machine according to claim 22 or 23, **wherein** the housing (12) has at least one air outlet opening at least close to the point where the circumference is largest.

25. Electric machine according to claim 24, **wherein** the air outlet is connected to the air inlet via a heat exchanger (14, 15) provided between them.

26. Electric machine according to claim 25, **wherein** the heat exchanger (14) transfers the heat of the machine (111) to a gaseous or liquid medium.

27. Electric machine according to claim 24, **wherein** the heat exchanger (15) transfers the machine (111) heat to a solid medium and in particular **wherein** the heat exchanger is designed to be a geothermal heat exchanger (15).

28. Electric machine according to one of claims 23 to 27, **wherein** a particle filter (16) is provided on the air inlet.

29. Electric machine according to claim 28, **wherein** the particle filter (16) has at least one fine metallic screen (17, 18).

30. Electric machine according to claim 29, **wherein** a magnet, particularly a permanent magnet (19), is located with one pole on the fine screen (17).

31. Electric machine according to claim 30, **wherein** a connection is established between a second fine screen (18) and the second pole of the magnet (19).

32. Electric machine according to one of the claims 30 or 31, **wherein** the fine screens (17, 18) are configured in such a way that they can be separated from the magnet (19).

33. Electric machine according to one of the claims 28 to 32, **wherein** a filter (16) is provided that is able to filter particles out of the flow of air that can be influenced electrically and/or magnetically.

34. Electric machine according to claim 22, **wherein** the housing (12) is designed in such a way that effective heat transmission is guaranteed between the housing (12) and the surroundings.